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WHAT IS TOUCH?

Matthew Ratcliffe

This paper addresses the nature of touch or ‘tactual perception’. I argue that touch encompasses a wide range of perceptual achievements, that treating it as a number of separate senses will not work, and that the permissive conception we are left with is so permissive that it is unclear how touch might be distinguished from the other senses. I conclude that no criteria will succeed in individuating touch. Although I do not rule out the possibility that this also applies to other senses, I suggest that the heterogeneity of touch makes it both distinctive and particularly problematic.

Keywords: content, individuation, phenomenology, senses, tactual perception, touch

1. Introduction

What characteristics unite all forms of touch and, at the same time, distinguish them from perception by means of another sense? In this paper, I will argue that there are none. My discussion will focus upon the influential list of criteria for individuating the senses proposed by Grice [1966: 135]:

1. What we are aware of via the sense. For example, colour is specific to vision and loudness to hearing.
2. The quality of the sensory experience, what Grice calls its ‘special introspectible character’.
3. The sensory stimulus (e.g. physical contact for touch, sound waves for hearing, and light rays for vision).

4. The structure of the sense organs and their connections to the brain.¹

The reason for this focus is that most subsequent accounts appeal to and further develop one or more of these same criteria.² Many continue to maintain that the phenomenology of sense perception plays a role. Some phenomenological approaches appeal to the distinctive experiential quality associated with each sense, whereas others emphasise what is perceived with that sense. It is debatable whether these criteria are compatible, and much of Grice's discussion is concerned with defending the distinction between (1) and (2) against the objection that there is no more to perceptual experience than what is perceived.³ Throughout this paper, I treat both criteria as phenomenological. Grice does not claim that (1) in the absence of (2) would amount to a complete absence of experience, but that there would be no more to the experience than what is experienced, no additional 'quality'.

There are also non-phenomenological approaches, which develop Grice's fourth criterion, sometimes in conjunction with the third.⁴ Perhaps the most sophisticated of these is that of Keeley [2002], who does not deny the reality of sensory experience but claims that it is not what individuates a sense. He proposes four criteria that are individually necessary and jointly sufficient for doing so:

1. Physics: Each sense is receptive to a different kind of energy.

¹ Grice offers these criteria in response to the more specific question of how to distinguish a newly discovered sense from a new form of an existing sense.

² Although most recent approaches develop only some of Grice's criteria, Grice himself maintains that they are all compatible.

³ See Coady [1974] for an early critique of Grice's distinction between (1) and (2). See Lopes [2000] for a defence of it. I will later side with Grice.

⁴ See Roxbee Cox [1970] and Nudds [2003] for overviews and critical discussions of all three types of approach.

2. Neurobiology: Different senses have different sense organs and connections to the brain.
3. Behaviour: The organism is able to discriminate stimuli on the basis of the relevant form of energy, without recourse to other ways of detecting differences.
4. Dedication: A sense is not only receptive to a stimulus but also dedicated to detection of that stimulus (where dedication is understood in evolutionary and developmental terms).

Keeley's criteria (3) and (4) are not mentioned by Grice. However, they are compatible with Grice's two non-phenomenological criteria and can be construed as refinements of them that serve to rule out certain counter-examples, rather than as a substantial departure from Grice's original list.

None of these approaches apply unproblematically to every candidate sense. Things get especially murky when we consider the senses of other species. There is an obvious problem here for phenomenological criteria: it is not clear how to reach reliable conclusions about the presence and character of sensory experience in non-human animals. Non-phenomenological criteria face problems too, at least in more exotic cases. For instance, Gray [2005] argues that, contrary to Keeley's account, pit vipers possess two kinds of sense organ dedicated to detecting the same class of energy, whereas vampire bats may have an organ dedicated to detecting two classes of energy.

However, I want to suggest that there is an equally if not more difficult problem closer to home, concerning touch. To simplify the problem, I restrict myself to the question of what distinguishes touch in humans from the other human senses, and do not discuss touch in other species. Distinguishing the human senses from each other might seem comparatively easy. For example, regardless of what applies to pit vipers, sight seems to be the only human sense that utilises light as a proximal stimulus. And different human senses surely involve distinctive kinds of experience. But the problem with touch (or 'tactual perception' – I treat

the two terms as synonymous) is its diversity. Touch, I will show, encompasses a range of very different experiences and has many different functions. Furthermore, there is no clearly bounded organ of touch and it is responsive to several different kinds of energy or sensory stimulus.⁵ I will argue against dividing touch up into a number of distinct senses, but will conclude that this leaves us with something so heterogeneous that no criteria can unite its various characteristics and at the same time exclude characteristics of other senses. Of course, not all attempts to distinguish the senses are shaped by the same assumptions, concerns and goals. Keeley [2002] seeks a naturalistic account that is applicable in the context of scientific research, whereas others, such as Grice, also aim to capture something of our everyday distinctions.⁶ However, my argument will apply to both kinds of project.

2. Touch and Physical Contact

There has been surprisingly little work on touch in the philosophy of mind, although notable recent contributions have been made by Martin [1992; 1993; 1995] and O'Shaughnessy [1989; 1995]. Neither author is principally concerned with what distinguishes touch from the other senses. Nevertheless, their work is suggestive of two criteria. O'Shaughnessy emphasises that touch is a *contact sense*:

.....in touch a body investigates bodies as one body amongst others, for in touch we directly appeal to the tactile properties of our own bodies in investigating the self-same tactile properties of other bodies. [.....]the space and solidity of our own bodies provides the access to the space and solidity of other bodies [1989: 38].

⁵ Others who have remarked upon the heterogeneity of touch include Roxbee Cox [1970] and Nelkin [1990].

⁶ See Nudds [2003] for a discussion of how analyses are shaped by different explanatory projects.

It is not always clear whether he is claiming that touch is distinctive insofar as it *operates via physical contact* or that it involves *experience of physical contact*. In fact, he endorses both: touch involves physical contact with an object of perception and also an experience of contact with it. Martin [1992; 1995] makes the more specific phenomenological claim that touch incorporates perception of the *boundaries* between our bodies and what they come into contact with. Hence we have two criteria that might individually or jointly succeed in individuating touch:

- i. Touch involves physical contact between a perceiver's body and an object of perception
- ii. The content of tactual experience includes a sense of physical contact with something or perhaps, more specifically, of the boundary between one's body and another entity.

Let us start with (i). Although physical contact is not sufficient for tactual perception, it might suffice to distinguish touch from other senses. Not all tactual perception involves contact with solid objects. But it could still be that there is always contact between perceiver and the perceived. For example, we perceive the heat of the air that comes into contact with our bodies and the force of the wind upon us. Hence we have a version of Grice's stimulus criterion (3), where the stimulus is physical contact with the perceived. In contrast, what we perceive through hearing, vision and smell is usually distinct from what stimulates the relevant sensory receptors. This does not rule out taste, which is also a contact sense, but the account could be refined by appealing more specifically to pressure. This would avoid the 'taste' objection, if it could be shown that taste does not rely upon pressure in the same way as touch. (I will refer to physical contact rather than pressure here, but my argument will also apply more specifically to pressure.)

However, it is not entirely clear how to understand the claim that tactual perception relies upon physical contact in a distinctive way. Touch depends upon a range of different kinds of sensory receptor in the skin, some deeper than others, and their receptive fields differ in size. These cutaneous receptors do not make direct contact with a perceived object. The surface of the skin might do so, but the receptors operate through a medium, just like other kinds of sensory receptor. When perceiving the touch of an object through one's fingernail or through the hard, thick skin of one's heel, its presence is more apparent. Granted, touch receptors are usually closer to the perceived object than in hearing, vision and smell, but proximity is not contact. We could still maintain that the *organism* comes into contact with what it perceives, but it is debatable where the exterior boundary of the perceiving organism lies. Keeley [2002: 12] suggests that, where the senses are concerned, the relevant boundary is between the nervous system and everything outside of it. In support of this, we can perceive the touch of a splinter beneath the skin's surface. However, it could instead be argued that the organismic boundary extends beyond the skin. Many of the nerve endings involved in touch are clustered around hair follicles, and it is often the hair that is acted upon by some force, rather than the skin. Humans do not have much hair, and the point could be made more effectively by appealing to furry mammals, many of which also use whiskers or 'vibrissae' to sense the proximity of objects and the width of apertures.

We could perhaps settle for a hazy boundary, but there is another line of criticism, which starts with the observation that stimulation by an entity does not amount to perception of that entity. Sight is receptive to light, and hearing to vibration in the inner ear, but what we perceive through these senses is not normally light hitting the retina or vibration in the ear; the proximal stimuli are means by which we perceive other things. Hence, although there is a habitual association between (a) perception by means of a sense that we call 'touch' and (b) 'touch' as two entities coming into physical contact with each other, it should not simply be

assumed that the content of (a) always includes (b). It follows that criterion (i), even though it is not explicitly phenomenological, can be challenged phenomenologically. If what we experience through touch does not always include something in physical contact with our bodies, then (i) fails to isolate a universal feature of tactual perception. The argument does not *have to* proceed phenomenologically though. We could instead ask which properties are ‘detected’ by a given sense [e.g. Gibson 1968]. Although an organism might detect more properties through touch than it experiences, it seems safe to assume that what is experienced is also detected. Hence a phenomenological case, if successful, can also be couched in non-phenomenological terms. (It is possible to weaken the contact claim, so as to insulate it from such criticism, by maintaining only that ‘touch utilises physical contact or pressure in a distinctive way’, regardless of what is perceived. I will address this weaker version in Section 6.)

Criterion (ii) is also vulnerable to phenomenological criticism. Martin [1995: 272] maintains that tactual sensation ‘has the character of being within one’s boundaries, and hence the feeling of being internal’, adding that a feeling of internality implies perception of externality too. But that a sensation is generated by stimulation at bodily location x does not entail that it is felt to be at x . And, even if it is felt to be at x , it need not incorporate a distinction between x and other parts of one’s body, or between x and things outside of one’s body. You don’t get perception of location and boundary solely in virtue of something occurring at a location near a boundary. Martin [1993: 211] acknowledges this but insists, on phenomenological grounds, that human tactual perception *does* invariably involve experience of the boundary between our bodies and what we make contact with. However, it is arguable that not all tactual experiences do. There are many cases where it at least seems that, through contact with an entity, we perceive something in addition to or perhaps even instead of that entity. A commonplace example of distance touch is a blind person using a cane to actively

explore the environment. Passive touch can also operate through an external medium. If I feel a hand on my back, I do not perceive my shirt; I perceive the hand through the medium of shirt and skin. Similarly, I do not perceive the sole of my shoe but the rough ground beneath it. But it could be argued that, in cases like these, we indirectly perceive or infer the properties of an entity by perceiving another entity. Surely we still ‘touch’ the cane and the shoe; we are not completely insensitive to them. However, I will argue in Section 3 that this response cannot accommodate all cases - touch does not require physical contact with an object of perception or, for that matter, experience of contact or boundaries. Hence criteria along the lines of (i) and (ii) should be rejected. In the process, I will also work towards a stronger claim: the contents of tactual perception are so diverse that no phenomenological characteristics unite them all and also distinguish them from other forms of perception. At the same time, I will resist the view that what we call ‘touch’ is actually a number of different senses.

3. The Contents of Tactual Perception

Consider the remarks ‘I feel hot’, ‘it feels hot’, ‘the room feels hot’, ‘I can feel the hot sun on my back’, ‘the cup feels hot’ and ‘the fire feels hot’. These could be associated with very different experiences of heat. The object of perception in each case is not simply ‘heat’ at a particular bodily location. I might feel hot without feeling that my surroundings are hot. Alternatively, I might feel that a room is hot without feeling hot myself, And ‘it feels hot’ can refer to a feeling of heat that does not neatly distinguish one’s body from its surroundings. These experiences all involve a rather diffuse sense of one’s body, one’s surroundings or both being hot. The experience of feeling the hot sun on one’s back is different. Here, one not only perceives the heat but also - in part through bodily movements and associated changes in patterns of sensation - that it comes from a particular direction, that it has a source. When

heat is perceived *as* emanating from a nearby entity such as a light bulb, one can even gage that entity's approximate location and size through tactual exploration of the surrounding area. In other cases, such as picking up a warm coffee cup, the touch of the object and the perception of its warmth seem to knit together seamlessly; what is perceived is not an object plus heat, but a hot object. Hence heat perception can have a wide range of experiential contents, which do not always incorporate a sense of coming into physical contact with something or of clear boundaries. In addition, the object of perception need not be the proximal stimulus; heat can be perceived *as* a property of something that is not in contact with one's body.

However, could we simply deny that heat perception belongs to touch? Some people lose the ability to detect heat while retaining other tactual abilities, and vice versa. But others suffer selective loss of colour vision, visual object recognition or visual perception of movement, and nobody would argue on that basis that such abilities are non-visual. There is, I think, a good phenomenological case for the unity of touch and heat perception: heat perception and perception of other properties are often co-constitutive of unified tactual experiences. I refer to 'heat', rather than 'temperature', because perceptions of hot and cold depend upon different kinds of sensory receptor, but the point applies equally to perception of cold. Helen Keller, in her account of the world she inhabited without sight and hearing, emphasises the richness and diversity of tactual experience, and how perception of cold encompasses much more than simple gradation: 'The coolness of a water-lily rounding into bloom is different from the coolness of an evening wind in summer, and different again from the coolness of the rain that soaks into the hearts of growing things' [1908/2003: 11]. The property of 'coolness' is integrated into the overall tactual experience, rather being an 'add-on' to the texture of a lily or the pressure of the wind.

We need not take Keller's word for this. It has been shown that tactual perception of environmental properties often depends upon combinations of sensory inputs. For instance, pressure plus cold can facilitate perception of wetness, whereas pressure plus warmth is often perceived as oiliness. Temperature also affects perception of heaviness - a cold coin placed on the forehead feels heavier than a warm one [Katz 1925/1989; Krueger 1982:10-11]. Much of what we are said to perceive through 'touch' thus depends upon hot and cold receptors working in concert with other kinds of receptor. One might object that the same applies to interactions between established senses. For example, how something tastes can be affected by how it looks, and tactual experience is influenced by what we see, as demonstrated by the 'rubber hand illusion' [Botvinick and Cohen 1998]. The relationship between heat, cold and pressure in tactual perception is different though. In the rubber hand illusion, the relevant property (the location of one's hand) is already perceived without the aid of vision. Input from vision changes how a type of property is perceived, rather than enabling perception of a property of that type. However, in the above example of wetness perception, there would be no perception of wetness at all if perception of cold were subtracted. Hence we can distinguish a form of interdependence that frequently characterises tactual perception (a) from a weaker form that applies to certain inter-sensory cases (b):

- a. Without both A and B, property C would not have been perceived at all.
- b. Without the addition of A to B, property C would have been perceived differently.

Not all perceptions of wetness depend upon a combination of pressure and cold. Hence the claim that C would not have been perceived applies to only some instances of C-perception. One might insist upon the stronger requirement that, for there to be sensory unity between A and B, all perceptions of C-type properties must depend upon the combination of

A and B. But this would be too strong, as perception of many property types does not rely exclusively upon one sense. For example, we perceive shape, size, texture and distance through vision and touch. So I suggest that (a) is the strongest form of interdependence we can require for a phenomenologically unified sense. With touch and temperature, this is what we have. The same level of interdependence may characterise some interactions between established senses, but it is ubiquitous in tactual experience. Should it turn out to be ubiquitous elsewhere too, this would raise problems for the more general project of individuating the senses [O'Callaghan forthcoming]. For current purposes though, I am concerned only with touch. Suffice it to say that, regardless of what applies to other senses, touch and temperature perception are sufficiently unified to resist separation.

There is the objection that a case based solely on phenomenology is not sufficiently persuasive. One might even appeal to phenomenology in order to challenge my position. For example, that we are able to focus our attention solely upon an experience of heat could be taken to show that it is separable from touch. I do not find that claim plausible. By analogy, I can visually attend to my computer keyboard, but this does not imply that my visual experience consists only of the keyboard, or that my perception of the keyboard is extricable from the rest of my visual experience. Even so, it could at least be maintained that appeals to phenomenology are unreliable. But a phenomenological case can call upon other sources, such as neurobiology, for support. The latter might be taken to show that touch and heat perception are distinct, as they depend upon different kinds of sensory receptor [Gray 2003]. However, recent neurobiological work better complements a single sense view. For example, Lumpkin and Caterina [2007] address the complexity and intermingling of the sensory mechanisms involved in touch and temperature perception. They emphasise the 'recurring theme' of the 'polymodality of putative transduction channels' (meaning that different stimulus types are processed by some of the same sensory mechanisms). This, they suggest,

‘raises the possibility that sensory integration begins at the first step of signalling’ [2007: 863]. And, according to Olausson et al. [2010: 186], certain kinds of pressure receptor are also responsive to cooling. This kind of evidence poses serious problems for any attempt to separate touch from temperature perception on neurobiological grounds.⁷

Even if we set aside perception of ‘hot’ and ‘cold’, the contents of tactual experience are remarkably diverse. Consider Keller’s description of what she perceived through vibration, which includes far more than entities in physical contact with her:

The thousand soft voices of the earth have truly found their way to me – the small rustle in the tufts of grass, the silky swish of leaves, the buzz of insects, the hum of bees in blossoms I have plucked, the flutter of a bird’s wings after his bath, and the slender rippling vibration of water running over pebbles. [...] I have endlessly varied, instructive contacts with all the world, with life, with the atmosphere whose radiant activity enfolds us all. The thrilling energy of the all-encasing air is warm and rapturous. Heat-waves and sound-waves play upon my face in infinite variety and combination, until I am able to surmise what must be the myriad sounds that my senseless ears have not heard. [1908/2003: 40-41]⁸

I do not claim that the ability to perceive sound waves thorough the skin literally amounts to a form of hearing.⁹ What I do want to emphasise though is that we perceive vibration through touch, and that this results in a range of different perceptual contents. When

⁷ See also Fulkerson [forthcoming] for a defence of the view that touch is ‘unisensory’ rather than ‘multisensory’.

⁸ Keller’s experience of touch was unusual in many ways. Nevertheless, many of the perceptual achievements she describes are refinements of familiar forms of perception, rather than radically novel abilities.

⁹ Neither would I want to insist that a ‘tactile visual substitution system’, which stimulates the skin, amounts to a form of vision.

we tactually perceive the vibration of loud music, the feeling of vibration can itself be the object of perception. We might further perceive it as emanating from some direction or location. However, vibration is often a means of perceiving something else, rather than the primary object of perception. Consider placing one's arm on a railway track as a heavy train draws close. What is perceived is not simply a pattern or rhythm but 'something coming'. Indeed, it is often difficult not to perceive vibrations as coming from some entity or event.¹⁰

One might respond that all these cases, and the heat cases too, also involve perception of the proximal stimulus that makes contact with one's body. Hence, even if perception of physical contact (criterion ii) is not universal, there is always perception of a stimulus that we are in physical contact with (criterion i). However, there are tactual experiences where this is clearly not so, such as experiences of absence. Much of the upper half of my body is currently in contact with my shirt but what I feel most conspicuously is a part that is uncovered, where the shirt is not tucked in. In that area, there is a slightly uncomfortable feeling of coldness, of the draft that is coming in through the door. I may well experience the draft but I also have an experience *of something being missing*. A different kind of experienced absence is also commonplace in active touch. Merleau-Ponty [1945/1962: 316] offers the following example: 'If I touch a piece of linen material or a brush, between the bristles of the brush and the threads of the linen, there does not lie a tactile nothingness, but a tactile space devoid of matter, a tactile background'. In perceiving the bristles, one also perceives the space between them. The sense of an absence of contact is as much part of the

¹⁰ Katz [1925/1989: 203-4] maintains that touch is more a vibration sense than a pressure sense. This, he observes, makes the claim that touch is a contact sense less plausible.

experience as contact is.¹¹ The fact that we can have tactual experiences of absence further shows that touch requires neither perception of something that we are in physical contact with nor experience of contact.

Can tactual perception be characterised in terms of some other content? This seems unlikely. The sense of touch accommodates a diverse range of experiential contents and, once various intuitions about touch and physical contact are rejected, it is not at all clear that there is a sense-specific content common to them all. Perhaps, one might argue, sophisticated contents such as ‘this object is cube-shaped’ are inferred from touch rather than perceived. If so, there might be a case for touch having distinctive limitations. However, I suggest that touch can involve a broad spectrum of contents, ranging from vaguely localised bodily sensations to recognition of something as a specific kind of object. The issue of where and how to draw the line between perceptual and non-perceptual content is, of course, a contentious one. I am inclined towards a fairly liberal view. For example, in the visual case, I would maintain that we can perceive a cup *as* a cup, rather than perceiving some other content and subsequently recognising a cup.¹² (My reasons are phenomenological – we do not usually have access to more basic experiences that such contents are derived from, and I do not think there are sufficient grounds for divorcing perceptual content from experience.) So

¹¹ This is partly because perception incorporates a sense of anticipation, which does not imply conceptual content. At least some perceptual anticipation is non-conceptual in nature. For example, you might feel surprise when a hand gently touches your shoulder, despite not having any explicit expectation about what will happen next.

¹² See Bayne [2009] for a good recent defence of the liberal view. His case hinges on the example of associative agnosia, where people have intact form perception but cannot categorise entities. This, he says, plausibly affects the ‘phenomenal character’ of perception.

my question is this: if we allow that visual experience can incorporate such contents, does the same apply to touch?

There are cases where it is unclear whether or not touch incorporates object recognition: when you wash a cup without seeing it, do you *perceive* it as a cup with your hands or do you *infer* from how it feels that it is a cup? Other cases are more straightforward though. Suppose you are handling a delicate artefact that you know to be worth \$10,000,000. This knowledge will no doubt have a profound effect upon your tactual experience, but it is not constitutive of the experience. Appreciation that this is artefact P, a cherished object worth \$10,000,000, is not ‘in the hands’. However, recognition of at least some kinds of object is integral to touch. Take the experience of rolling a tube between your hands. You do not have two distinct perceptions, one in each hand, but a unified perception of the tube. As Gibson [1962: 481] notes, what you perceive is a tubular object, rather than two separate sets of ‘local signs’. So touch can at least distinguish certain objects on the basis of shape. You not only perceive the tube. In so doing, you recognise it *as* a tube.

How limited is touch’s capacity for distinguishing kinds of object? Even if we take something as simple as a cube, the act of recognition is often distinct from tactual perception. If you stumble upon a cube by accident and rely solely upon touch to identify its shape, you will not *perceive it as* a cube but *infer that it is* a cube after you have explored it tactually. However, in a more constrained scenario, I suggest that it could be perceived as a cube. Imagine having a dull job that, for whatever reason, involves picking spheres from a big jar and separating them from the occasional cube that turns up. After doing this for a while, you would recognise something as a cube as soon as you touched it, rather than having to feel around and then infer that it is a cube. So, where perception is constrained by habit, skill and anticipation, object recognition through tactual perception seems a lot more plausible. Indeed, it may be that touch can involve recognition of quite specific categories of object, rather than

just cubes and the like. The fact that it seldom does so is, I suggest, not a principled but a contingent limitation upon its discriminative ability, as exemplified by people with extraordinarily refined tactual perception, such as Helen Keller.

4. Experiential Character

Let us turn to Grice's much-debated second criterion and consider whether all instances of touch are unified by a common experiential character, despite diversity of content. I will take Martin's account of touch and bodily experience as my starting point for this. Martin maintains, on phenomenological grounds, that body sense is partly constitutive of touch. He claims that touch does not involve a bodily feeling plus the perception of some object outside of the body but only the 'one state of mind, which can be attended to in different ways' [1992: 204]. What we perceive is a boundary, and the most prominent aspect of the experience might be what falls 'outside' or 'inside' of it. However, because a boundary is always perceived as having an inside and an outside, the recessive aspect of the experience is never wholly absent.

I suggest that matters are more complicated than Martin acknowledges. Touch is indeed a unitary experience, rather than a combination of 'bodily' and 'external' components, as I will further emphasise in Section 5. Martin is also right to note that one or the other aspect can be most prominent. But he misconstrues bodily experience by assuming that it is exhausted by the perceived body: 'awareness of one's body as one's body involves a sense of its being a bounded object within a larger space, and that just is to locate it within a space of tactual objects' [1993: 213]. When it comes to effortless interaction with a tool, for instance, we do not simply perceive our bodies as recessive objects of perception. The body features in experience as that which *perceives*, more so than as something *perceived* [Ratcliffe 2008]. Perceiving a pen, while comfortably and effortlessly using it as a tool, involves a sense of

one's hand as inconspicuous, far from the forefront of experience. Once the hand becomes conspicuous, when it sweats, aches and the pen slides, the pen is perceived differently too. The hand that feels clammy, conspicuous and awkward is no longer a medium through which the pen could be perceived as something to be effortlessly used. Hence a change in the manner and extent to which a part of the body appears as an object of perception is at the same time a change in how one perceives something else.

It is often maintained that experience is 'transparent', meaning that its qualities are exhausted by what is experienced. Hence Grice [1966] worries that the 'special introspectible character' of a sense might collapse back into an account of what we are aware of through it. However, this does not apply to touch. Its 'special introspectible character' *is* bodily experience and the phenomenology of the body is not exhausted by its being an object of perception. The changeable way in which the body appears is, at the same time, a changeable *way of perceiving* other entities. So we experience our perceiving, rather than just what we perceive. Even when the perceiving body or part of it is not a conspicuous object of tactual perception, it can still have a phenomenology, as exemplified by the contrast between a hand that is effortlessly immersed in activity and the same hand when anaesthetised. In the latter case, you no longer feel the hand, whereas in the former you do. Even though it is not a salient object of perception, you can still tell where your fingers are, whether they are touching each other, and whether and how they are moving.

The phenomenology of the perceiving body is as diverse as other aspects of tactual experience. Sometimes the body is conspicuous, sometimes it is recessive, and there is a continuum between the two poles. Where it is at its most recessive, it is arguably no more conspicuous than in visual perception [Scott 2001]. In addition, although the boundary between one's body and a perceived object is sometimes clear, it is often not. I have already mentioned tactual perception of heat, where there can be an absence of clear boundaries, but

the point applies more generally. Passive touch frequently involves a lack of phenomenological differentiation. As I lean my elbow on the table and think about what to write next, the experience does not incorporate a clear elbow/table contrast. The same goes for the clothes on my body and my bottom on the seat. It is only when I feel discomfort that the boundaries become salient. I have also mentioned examples of active touch where the boundaries are unclear, such as using a stick to navigate and writing with a pen, and there are plenty of others. The situation is more complicated than there being no boundary in comfortable passive touch and effortless active touch, and a boundary when there is discomfort. It is not just a matter of degrees; boundaries and their absence are also experienced in various different *ways*. The hand that tentatively explores a visually obscured and potentially threatening environment feels vulnerable, the body that lies on the sofa feels comfortable and secure, and the hand that ineffectively tinkers with the components of a broken watch feels awkward. Granted, tactual experience is causally influenced by various non-tactual perceptions, emotions and thoughts, but it is also plausible to maintain that it *incorporates* a range of affective qualities. In fact, there is considerable empirical support for the view that some forms of touch are intrinsically affective [McGlone et al. 2007; Löken et al. 2009; Olausson et al. 2010].

Interpersonal boundaries are also variable in degree and quality. When you first hold another person's hand, it might seem clearly separate from you, 'other than you'. After a while, there can be a sense of commonality and lack of differentiation. And take the experience of receiving a welcome caress. Here, one's body feels conspicuous, as might one's boundaries, but it does not feel alienated from the other person's touch like the body that is subjected to an uncomfortable, unpleasant or unwelcome touch. In contrast to the view that touch is a boundary sense, it is interesting to note the profound feeling of separation from others that can be associated with deprivation of interpersonal touch. Consider the testimony

of Nick Yarris, a man who spent twenty-two years on America's Death Row for a crime he did not commit. After it was declared that 'no human hand would touch him', he had no bodily contact with anyone for fourteen years, and was led out into the yard on a leash to maintain distance. This contributed to his feeling like a 'bleak empty vessel', and he resorted to making his arm numb and placing it on his face, 'just to feel a strange human hand on my face.....to feel alive'.¹³ Touch is not only a matter of perceiving boundaries and differences; it also contributes to feelings of commonality and relatedness between people, without which we can feel isolated and diminished. Of course, these are not simply feelings of spatial, physical proximity, and this further illustrates that the phenomenology of touch, the sense of connection that it incorporates, does not simply track physical contact.

5. The Organ of Touch

Given the extraordinary diversity of tactual experience, it is not at all clear how touch might be phenomenologically individuated. Perhaps, however, we will have more success with non-phenomenological criteria. Let us consider Grice's fourth criterion: that touch is facilitated by a distinctive and circumscribed sense organ – the skin. This surely sounds plausible.

However, we should reject the additional requirement that there be a distinctive way of connecting to the brain. Take the case of "affective touch" mentioned earlier. C-tactile afferents are found only in hairy skin and project to insular cortex, a brain area implicated in positive emotion, whereas various other nerve fibers involved in touch project to somatosensory cortex [Löken et al. 2009].¹⁴ If touch involves at least two distinct ways of connecting to the brain, why exclude others? Let us therefore restrict ourselves to the claim

¹³ From an interview broadcast on the UK's BBC Radio 4 on 12th January 2008.

¹⁴ This point applies to other sensory modalities too. For example, there are 'dorsal' and 'ventral' visual pathways [Goodale and Milner 1992].

that the skin is the organ of touch. Of course, it is not simply 'skin' that facilitates touch. Hence we need to distinguish a crude sense organ view that appeals to superficial anatomy from a sophisticated account of how the outputs of sensory receptors located in the skin interact to facilitate tactual perception.

I will reject the sense organ view, on the basis that touch is *equally* reliant upon sensory receptors elsewhere in the body. Suppose it were discovered that all we could perceive by means of receptors in the skin were diffuse tingling sensations. Would we then maintain that, contrary to popular belief, touch is just a diffuse tingling sensation? Alternatively, would we acknowledge that the organ of touch consists of more than just the skin? I suggest the latter. Hence the organ criterion should take the form 'x is the organ of y', rather than 'y is whatever x turns out to enable'. In other words, the view that the skin is the organ of touch presupposes at least some appreciation of what touch is. Perceptual achievements that are uncontroversial instances of touch must therefore depend upon the skin in the right kind of way, and I will argue that they do not.

Two different conceptions of touch are employed in psychology and elsewhere. There is 'tactile perception', the sole input for which comes from sensory receptors in the skin. This works in concert with proprioception (a sense of bodily position) and kinaesthesia (a sense of bodily movement). The term 'haptic perception' refers to a more inclusive conception of touch that incorporates all three [e.g. Klatsky and Lederman 2002: 508]. I will argue that tactile perception without proprioception and kinaesthesia (I refer to a combination of the latter two as 'body sense') would be so impoverished as to bear very little resemblance to the phenomenology and discriminative capacity we associate with the sense of touch. Hence tactual perception is 'haptic' rather than 'tactile'.

J. J. Gibson [1968] famously makes a case along such lines for all the senses. He observes that we can continue to perceive the same environmental property, despite

significant changes in patterns of sensory stimulation. From that, he argues that a perceptual system is comprised of considerably more than an anatomically distinguishable bundle of peripheral receptors. Whatever might be said for the other senses, this certainly applies to touch. Cutaneous sensation, proprioception and kinaesthesia do not interact in a way that allows us to distinguish three discrete perceptual outputs that later combine, and to identify touch with only one of these outputs. Receptors in the skin, muscles, tendons and joints work together in relations of mutual dependence, rather than additively [Loomis and Lederman 1986: 2]. Take the example of self-tickling. The sensory effects are considerably less pronounced than when someone else tickles you, regardless of whether you know what they are about to do. Non-conscious anticipation of the effects of self-initiated bodily movement causes ‘perceptual attenuation’ [Blakemore, Wolpert and Frith 2000]. So sensory input from the skin is not only combined with other inputs; it can also be altered by them. As this example illustrates, body sense can be thought of in terms of non-conscious processes. In fact, Gibson’s account of perceptual systems is explicitly non-phenomenological. He maintains that perception is not about ‘having sensations’ but ‘detecting information’, and proceeds to set aside perceptual experience altogether [Gibson 1968: 2].

However, there is also a good case for the complementary but distinct view that bodily *experience* plays a constitutive role in tactual perception. Take any list of properties that are generally agreed to be tactually perceivable, such as wetness, stickiness, hardness, roughness, smoothness and sliminess. Perception of these and many other kinds of property depends upon a combination of body sense (construed phenomenologically as an awareness of bodily position and movement) and tactile sense. Texture perception is an essentially dynamic process, which usually incorporates bodily movement, along with a sense of how one’s body is moving and of how that movement is aided or impeded by a surface. Nevertheless, passive touch, without bodily movement, can also facilitate sophisticated

perceptual discriminations. When a spider crawls up your arm, you perceive the separate points of contact as interrelated in systematic ways, as ‘an entity moving up my arm’ rather than a series of separate sensations. Passive touch is never a matter of what one might call ‘mere sensation’. Even in passive point contact with an object, there is a sense of approximately where the contact occurred - the experience is *of* a certain part of one’s body being affected. In addition, one usually has at least some sense of the nature of the stimulus, such as whether one has been hit by a hard object or brushed by something light and soft. And, contrary to what some have indicated [e.g. Merleau-Ponty 1945/1962: 315], texture perception does not invariably require active bodily exploration; we can perceive texture when something moves across our stationary bodies.

Although passive touch incorporates bodily awareness, its discriminative capacity might seem to count against the view that experience of bodily movement contributes to touch: if we can tactually perceive a wide range of properties without moving, then a sense of movement is not constitutive of our ability to do. But that would be wrong. The ability to distinguish properties through passive touch is reliant upon the recognition that we are not moving. And an ability to perceive whether and how we are moving is as essential to the sense that we are not moving as it is to the sense that we are. Without it, one could not distinguish the sensation of an object moving along one’s arm from that of the arm actively moving along an object. Hence kinaesthetic experience is implicated in passive touch too. Only a being capable of actively touching could also have an experience of passive touch.¹⁵

¹⁵ Our awareness of bodily movement strikes me as particularly problematic for Scott [2001], who denies that bodily experience is integral to touch. It would be odd – to say the least – to perceive a texture without any awareness of what one’s body is doing, and it is doubtful that the result would be intact texture perception minus kinaesthetic awareness.

If perception of property p relies upon a combination of sensory inputs A, B and C, it would be wrong to claim that the sense which enables perception of p includes only A. This, I suggest, applies to the roles of cutaneous sense, proprioception and kinaesthesia in tactual perception. The case can be made phenomenologically and non-phenomenologically. If cutaneous sensation were extricated from bodily experience, what remained would bear little resemblance to any of the experiences we associate with touch. It would not even have a felt bodily location. In non-phenomenological terms, touch without body sense would have few if any of the discriminative capacities associated with tactual perception. Hence the skin alone is not the organ of touch; the whole skeletal-muscular system is involved. There is no neatly circumscribed ‘organ’ of touch, other than the dynamic human body.

We can still maintain that touch is distinctive insofar as it is *partly* accomplished by certain kinds of specialised receptor in the skin. But why exclude taste receptors in the tongue, rods and cones in the retina, or cells in the inner ear that detect vibration? The answer, presumably, is that they contribute to taste, vision and hearing, rather than touch. Of course, they differ in various ways from receptors in the skin. However, if we allow that touch involves several different kinds of receptor in the skin, as well as sensory receptors as diverse as those in the joints, tendons and muscles, then why not rods, cones and other kinds of receptor too? Without a well-defined touch organ, a distinction between the kinds of receptor involved in touch and other kinds falls back on a prior understanding of those senses as distinct.

It might be objected that, in Section 3, I resisted a multisensory view of touch on the basis that it involves a high degree of phenomenological and neurobiological integration. But this need not be so high as to imply an isolable ‘organ’ of touch. And suppose the level of integration were markedly greater than that between any of the senses, to a degree that

enabled us to identify a functionally cohesive system. Even this would not suffice to individuate touch. That a sensory system is distinct – to some extent at least – from an organism’s other sensory systems does not make it a particular *type* of sensory system. An organism could have two visual systems that were largely or wholly separate from each other but it would not, in virtue of this, have two kinds of sense. Hence, although such a scenario would provide us with grounds for maintaining that touch is a sense, it would not tell us what makes it a distinctive kind of sense. To do that, we would need to fall back on criteria that have eluded us. For example, we could try to strengthen the organ criterion by also appealing to what is detected: maybe certain combinations of receptor together comprise a perceptual system in virtue of their receptivity to a particular class of environmental ‘invariants’, as suggested by Gibson [1968]. However, as already pointed out, we detect a heterogeneous range of properties through touch. And Gibson himself appears pessimistic about such an approach, maintaining that perceptual systems ‘overlap’, they are not ‘mutually exclusive’ and the same information can be picked up by different perceptual systems [1968: 3].¹⁶

6. Stimulus, Function and Dedication

Another option is to argue that touch is receptive to certain stimulus types. Even though it facilitates perception or detection of a wide range of properties, it might utilise the same kind of stimulus to do so or, to adopt Keeley’s [2002] formulation, the same form of energy. However, it should be apparent from what I have already said that this will not work either. Touch is receptive to different kinds of energy, such as physical pressure and heat. Furthermore, ‘heat’ itself is not a unitary stimulus type; radiant energy emanating from a

¹⁶ See also Keeley [2002: 18] for the point that Gibsonian invariants will not serve to individuate the senses because different senses can detect the same invariants.

source is different from the mean kinetic energy of a medium. Gray [2005] modifies Keeley's account by appealing to common environmental sources: a sense might utilise different forms of energy in order to reliably detect a single source type that they both originate from. Again though, the problem is that touch is receptive to such a wide range of different environmental properties or 'sources'. In addition, touch is surely *dedicated* to detecting a wide range of properties, utilising different combinations of energies in order to do so. It is dedicated to detecting heat, amongst other things. It may also be sensitive – to some degree at least – to differences between radiant and kinetic energies, insofar as the kinds of exploratory movement involved in detecting various properties of heat sources exploit characteristics specific to radiant energy.

We do not have dedicated sensory receptors for all of the property-types that touch is receptive to, but this does not imply a lack of dedication. Touch reliably utilises a wide range of different 'exploratory strategies', which rely upon various parts of the body and combinations of movements, in order to detect different properties [Klatzky and Lederman 2002: 510]. As well as facilitating perceptual exploration and manipulation of the environment, it has important sexual and social functions [Montagu 1986]. It is thus dedicated to far more than we might infer from studying sensory receptors alone. Although certain parts of the body, in conjunction with certain behavioural strategies, might be dedicated to fairly specific perceptual tasks, the sense of touch as a whole is not specifically dedicated and instead encompasses a remarkably diverse range of perceptual achievements. Hence Keeley's 'energy' and 'dedication' criteria do not apply to touch. As his behaviour criterion (that an organism can discriminate stimuli solely via the relevant form of energy) rests on the assumption that there is a unique form of energy involved, this is inapplicable too. And, as already argued, appeals to an organ of touch presuppose an understanding of what touch is and do not succeed in distinguishing it from other kinds of sense.

7. Conclusions

I have argued that none of the Gricean criteria, however refined, succeed in characterising touch. It involves a diverse range of experiences, and its ‘experiential quality’ also varies enormously: an experience that has part of one’s body as its most conspicuous object is very different from one where the body operates as an inconspicuous medium of perception or maybe even disappears altogether from experience. Touch is also receptive to various different stimulus types and there is no discrete organ of touch. I do not exclude the possibility that attempts to individuate the other human senses will encounter similar problems. Even so, touch is surely distinctive in its degree of heterogeneity, and thus particularly difficult to accommodate.

Various authors, from Aristotle onwards, have indicated that touch is not a specialised sense that some animals have and others do not.¹⁷ It is inextricable from the having of a mobile animal body, from being behaviourally receptive in any structured way to one’s surroundings [e.g. O’Shaughnessy 1989: 38; Husserl 1952/1989:158]. I think this is right, but not for the reason O’Shaughnessy claims – that an ability to navigate the world unavoidably involves the ability to recognise when one is and is not in physical contact with things. Rather, it is difficult to see how any creature could be responsive to its environment without utilising at least *some* of the perceptual achievements that fall under ‘touch’. Touch does not have some singular essence that is inextricable from the having of a body; it includes so much that it is seemingly unavoidable.

However, Grice’s list of potential criteria is not exhaustive, regardless of how many refinements we might consider. It is therefore difficult to conclusively rule out the possibility

¹⁷ See Freeland [1995] for a good discussion of Aristotle on touch.

of some set of criteria succeeding. Even so, the reasons why Gricean criteria fail also make it highly unlikely that other criteria will succeed: touch is just too heterogeneous and spans a remarkably wide range of perceptual achievements. To further illustrate the problem, consider Carruthers' [2000: 122] proposal that touch and vision are phenomenologically distinguishable because their perceptual contents incorporate space and time in different ways. For example, you can visually perceive the shape of a large object almost instantaneously, whereas tactual perception of its shape requires diachronic exploration. I doubt that this holds, for reasons pointed out by Scott [2007], who argues that phenomenologically distinguishable visual and tactual experiences of the same entity could have much the same spatiotemporal structure. But, for the sake of argument, let us suppose that Carruthers succeeds in identifying an aspect of visual experience that distinguishes it from all forms of tactual experience. What would this tell us about touch?

Human vision may well be distinguishable from touch in several ways. For instance, it utilises light as a medium, allows us to perceive colour and involves a field that is arguably quite unlike any 'tactual field'. But stating what touch is *not* does not suffice to tell us what it is. The contrast between another sense and all the achievements we classify as touch does not in itself point to a positive characteristic that those achievements share. For example, touch encompasses so many different spatiotemporal profiles that it is not clear why all of them should be grouped together and distinguished from one further profile. We could maintain that seeing something is more different from perceiving point contact, texture, heat, heat sources, shape, weight, interpersonal connection, vibration and sources of vibration than any of them are from each other. However, it is not clear how the degree of phenomenological similarity or difference between experiences is to be measured. Even if we concede that visual experience is somehow 'more different', this does not resolve the matter. If a form of perception incorporates A, B and C, all of which are quite different, what exactly are the

grounds for excluding D, even if it is a bit more different? What is needed is a non-arbitrary commonality that unites A, B and C *and* at the same time excludes D. It seems unlikely that there are any.

A specific form of touch might well be distinguishable from all non-tactual perception via some of the criteria that I have rejected. For example, it is notable that touch, unlike the other senses, *can* at least involve the experience of physical contact with something or, more specifically, of force. As Hans Jonas emphasises:

...touch is the sense, and the only sense, in which the perception of quality is normally blended with the experience of force, which being reciprocal does not let the subject be passive; thus it is the sense in which the original encounter with reality as reality takes place. [1954: 516]

However, force or pressure is not a salient characteristic of many other tactual experiences, such as feeling a large animal breathing hot air down your back, feeling vibrations in the ground emanating from an approaching object or feeling that a place is cold. It is also debatable whether touch is the only sense that involves force perception. For instance, the experience of a loud noise is not easily decoupled from a feeling of pressure in the ears. Even if we concede that force perception or some other quality is exclusive to a subset of tactual experiences, this will not serve to distinguish touch from other senses. If ‘touch’ includes experiences A, B and C, which we want to distinguish from experiences D, E and F that characterise other senses, it will not do to emphasise only A, as tactual experiences B and C will be excluded along with D, E and F.

None of this is to suggest that we have any trouble talking about a sense of touch. However, our doing so does not imply anything more substantive than convention. By analogy, if all members of a community are in the habit of referring to an arbitrarily

delineated area on the north side of city M beyond the N bridge with a specific name, reference can proceed effortlessly.¹⁸ It is arguable that the ‘sense of touch’ is indeed a matter of convention, although in drawing attention to this possibility, I do not wish to rule out others.¹⁹ A conventionalist account of the senses is hinted at by Roxbee Cox [1970: 545] but developed more fully by Nudds [2003]. Both emphasise the *use* of discriminating between the senses, and claim that reference to a particular sense serves to inform us of what another person is likely to have perceived. ‘B touched y’ and ‘B saw y’ are both more informative than ‘B perceived y’. For instance, use of ‘saw’ or ‘touched’ tells us whether or not B is likely to have perceived the colour of y. Roxbee Cox adds that talk of different senses also helps us to appreciate what we would need to do in order to perceive what B perceived. However, a conventionalist account of this kind runs into difficulties with touch. Although it is helpful to know whether B saw or touched y, use of ‘touch’ here does not correspond to the ‘sense of touch’ but to ‘active touch with the hands’.²⁰ Most references to touch and touching are like this. It can be very informative to know whether B actively touched y with the hands, but this is much more specific than knowing that B perceived y via one of the many quite different perceptual achievements that fall under ‘touch’. It is not ordinarily the ‘sense of touch’ that we contrast with other kinds of sensory achievement, but more specific information concerning how something was perceived. This might be explicitly supplied or,

¹⁸ But things would not proceed so smoothly when it came to determining whether or not a newly discovered sense was an instance of touch; there would be no principled way of deciding.

¹⁹ For example, a referee suggested that we might be able identify certain central or paradigm cases of touch, perhaps with the aid of evolutionary considerations. This would not suffice to individuate touch, but it would at least give us an account based on more than convention.

²⁰ Katz [1925/1989: 28] emphasises the hand, rather than the skin, as an organ of touch.

alternatively, implicitly specified by context.²¹ The same applies to scientific uses of the term, where what is studied is usually a more specialised achievement. Hence the utility of distinguishing a unitary ‘sense of touch’ is unclear. And, as the conventionalist case for distinguishing a sense rests upon the utility of doing so, it is unclear how it might support a distinction between touch and the other senses. This is not to reject such an approach outright, but to suggest that more work is required to make it convincing. What is needed is an account of the contexts in which people *do* appeal to the broader ‘sense of touch’ discussed here and its explanatory utility in those contexts.

To conclude, how should we answer the question ‘what is the sense of touch?’ I have argued that it is a heterogeneous assortment of variably integrated perceptual achievements, and that no phenomenological or non-phenomenological characteristics serve to characterise them all, while excluding all other kinds of perception. When people talk about touch, they usually mean something more specific, which is partly why its puzzling nature usually goes unnoticed.²²

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²¹ Roxbee Cox [1970: 542] suggests using the term ‘feeling’ instead of ‘touch’. However, this is equally unspecific, if not more so, and thus faces the same problems.

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